

Patent

Attorney Docket: 54014.8101.US01

Amendments to the Claims:

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1. (Amended) A method for producing a lignin derivative, said method comprising the step of binding an oxygen atom of the hydroxyl group and a β -positional carbon atom of a diphenylpropane unit contained in a lignophenol derivative, where the diphenylpropane unit is formed by binding a carbon atom at an ortho-position relative to a phenolic hydroxyl group of a phenol derivative to a carbon atom at a benzyl-position of a phenylpropane unit of lignin, to obtain an arylcoumaran derivative containing an arylcoumaran unit in which a coumaran skeleton is bound to an aromatic ring of the phenylpropane unit of lignin.

Claims 2-7 (cancelled)

8. [New] The method according to Claim 1, said method further comprising the step of adding an acid to a lignin solvated with phenol derivative to convert a phenylpropane unit of lignin into a diphenylpropane unit by grafting the phenol derivative to the phenylpropane unit.
9. [New] The method according to Claim 1, wherein said binding step heats the lignophenol derivative under alkali conditions such that the phenolic hydroxyl group of the phenol derivative can dissociate.
10. [New] The method according to Claim 1, wherein the phenol derivative comprising one or more of monovalent phenol derivative, divalent phenol derivative, or trivalent phenol derivative, and

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the phenolic hydrogen group of the phenol derivative comprising at least one unsubstituted ortho-position.

11. [New] The method according to Claim 10, wherein the phenol derivative comprising a phenol, a cresol, methoxyphenol, a naphthol, a catechol, a resorsinol, a pyrogallol or a combination thereof.
12. [New] The method according to Claim 1, said method further comprising the step of adding an acid to a lignin solvated with phenol derivative to convert a phenylpropane into a diphenylpropane unit by grafting the phenol derivative to the phenylpropane unit, where a carbon atom at an para-position relative to a phenolic hydroxyl group of the phenol derivative is bound to a carbon atom at a benzyl-position of the phenylpropane unit of lignin, to obtain a lignophenol derivative.
13. [New] The method according to Claim 1, wherein the lignin derivative further comprising an additional phenylpropane unit of lignin.
14. [New] A lignin derivative comprising:
an arylcoumaran unit in which a coumaran skeleton is bound to an aromatic ring of a phenylpropane unit of lignin; and
a diphenylpropane unit formed by binding a carbon atom at an ortho-position and/or a para-position relative to a phenolic hydroxyl group of a phenol derivative and grafting the phenol derivative to a benzyl-position of a phenylpropane unit of lignin.

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15. [New] The lignin derivative according to Claim 14, wherein the phenol derivative comprises monovalent phenol derivative, divalent phenol derivative, or trivalent phenol derivative, or combinations thereof, and a phenolic hydrogen group of the phenol derivative comprising at least one unsubstituted ortho position.
16. [New] The lignin derivative according to Claim 15, wherein the phenol derivative comprising a phenol, a cresol, methoxyphenol, a naphthol, a catechol, a resorsinol, or a pyrogallol, or a combination thereof.
17. [New] The lignin derivative according to Claim 14, further comprising a phenylpropane unit.
18. [New] The lignin derivative according to Claim 14, having a weight-average molecular weight of about 500 to 2000.
19. [New] A molded product comprising the lignin derivative according to Claim 14.
20. [New] The molded product according to Claim 19, wherein a molding substrate material is molded to obtain said molded product, said molded substrate material comprising a chip-like material, fibrous material, and powdery material or combinations thereof.
21. [New] The molded material according to Claim 20, wherein the molding substrate material comprises cellulose.
22. [New] A method for producing a molded product comprising the step of using the lignin derivative according to Claim 14 to obtain a molding substrate material.

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23. [New] The method according to Claim 22, further comprising the step of dissolving the lignin derivative in a solvent to form the molding substrate material and evaporating the solvent.
24. [New] The method according to Claim 23, wherein the solvent comprises acetone, ethanol, methanol, dioxane, or tetrahydrofuran, or the combination thereof with water.
25. [New] A method for treating a molded product, said method comprising the steps of:
 - (a) adding a solvent having affinity for the lignin derivative according to Claim 14 to a molded product containing the lignin derivative; and
 - (b) recovering the lignin derivative.
26. [New] The method according to Claim 25, wherein the molded product comprises cellulose.
27. [New] The method according to Claim 25, wherein the solvent comprises acetone, ethanol, methanol, dioxane, tetrahydrofuran, or the mixture of any one of them with water.
28. [New] The method according to Claim 25, wherein said step (b) comprises soaking the molded product into the solvent.
29. [New] The method according to Claim 25, wherein said step (b) further comprises recovering molding substrate material of the molded product.